CEE 330-Hydromechanics
Course Syllabus-Spring 2016

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Lectures: TR 1:30 – 2:45 pm Room: Dragas Hall 2106

Instructor Office Hours: M 1:00 - 3:00 pm, or by appointment
Grader Office Hours: By appointment

Course Description:
This course studies the fundamentals of the fluid behavior at rest or in motion. Studying fluid statics and dynamics enables solving engineering problems such as flow rate through pipes, hydrostatic loads on structures, or drag forces on floating or submerged objects.

Learning Objectives:
- Fluid Properties
- Fluid Statics, Hydrostatic Forces
- Fluid Dynamics, The Bernoulli Equation
- Fluid Kinematics
- Conservation Laws for Mass, Momentum, and Energy
- Dimensional Analysis
- Viscous flow in Pipes, Laminar and Turbulent Flow
- Boundary Layer
- Drag Forces in Viscous Fluids

Textbook
Fundamentals of Fluid Mechanics, 7th Edition, by B. R. Munson, T. H. Okiishi, W.W. Huebsch, and A. P. Rothmayer, John Wiley and Sons, 2013.

Course Communications:
Course materials will be available on Blackboard: www.blackboard.odu.edu
Allow up to 48 hours for response to emails.

Prerequisite: Dynamics (MAE 205), Calculus II (Math 212)

Grading Policy:

Homework 5%, Quizzes 20%, First Exam 20%, Second Exam 20%, Final Exam 35%

Homework:
Homework will be assigned upon completion of each chapter and will be due one week after assignment at the beginning of the class. Group work is accepted but blind copying is not allowed. Late homework will not be accepted. Students should have a valid university excuse to request exception. The Homework will be graded by a grader and not all homework problems may be graded.

Quizzes:
Quizzes are assigned on the homework due dates. They include a single problem from the homework assignments due on that date. Quizzes will be graded by the grader. No books, notes, or other resources can be used during the quiz.

Exams:
Two mid-term exams and a final exam are scheduled. Each student may prepare notes on the front and back of a letter size paper for his or her own use. This sheet can only include formulas (not problems or examples) and will be turned in with your exam. No resources other than the formula sheet can be used. Exam #1 will cover chapters 1-3 and exam #2 will cover chapters 4, 5, and 7. The final exam will be cumulative.

Absence:
Student attendance in the lectures is strongly encouraged. Presence in all the quizzes and exams are required. Students should have a valid university excuse for absence from the exams or quizzes or missing assignments. It is the student's responsibility to notify the instructor in advance and make appropriate arrangements.

Course Outline:

Note: This schedule is tentative and may be changed due to travel or other incidents. The class will be notified in advance of possible changes.

Week	Meeting	Date	Topic	Reading
1	2	Jan. 12	Introduction, Properties of Fluids, Dimensions and Units, Ideal Gas Law	1.1-1.5
	2	Jan. 14	Viscosity, Fluid Compressibility, Surface Tension	1.6-1.11
2	3	Jan. 19	Fluid Statics	2.1-2.4
	4	Jan. 21	Pressure Measurement	2.5-2.7
3	5	Jan. 26	Hydrostatic Forces on a Plane Surface	2.8-2.9
	6	Jan. 28	Hydrostatic Forces on a Curved Surface, Buoyancy	2.10-2.11
4	7	Feb. 2	Pressure Variation in a Rotating Fluid	2.12
	8	Feb. 4	Elementary Fluid Dynamics, the Bernoulli equation	3.1-3.2
5	9	Feb. 9	Newton's Second Law Normal to a Streamline	3.3-3.4
	10	Feb. 11	Static, Stagnation, and Dynamic Pressure, Example	3.5-3.6
6	11	Feb. 16	Energy Line and the Hydraulic Grade Line, Restrictions	3.7-3.8
	12	Feb. 18	Fluid Kinematics, the Velocity and Acceleration Fields	4.1-4.2
7	13	Feb. 23	Control Volume, Reynolds Transport Theorem	4.3-4.4
	14	Feb. 25	The Continuity Equation	5.1
8	15	Mar. 1	The Linear Momentum	5.2
	16	Mar. 3	**Mid-term Exam 1**	

9		Mar. 8, 10	**Spring Break-No Class**	
10	17	Mar. 15	Examples on Linear Momentum Principles	5.2
	18	Mar. 17	First Law of Thermodynamics, the Energy Equation	5.3
11	19	Mar. 22	Examples on Energy Equation Applications	5.3
	20	Mar. 24	Dimensional Analysis	7.1-7.3
12	21	Mar. 29	Similitude and Modeling, Typical Model Studies	7.5-7.9
	22	Mar. 31	Viscous Flows in Pipes, Laminar Pipe Flow	8.1-8.2
13	23	Apr. 5	Turbulent Pipe Flow	8.3
	24	Apr. 7	**Mid-term Exam 2**	
14	25	Apr. 12	The Moody Diagram, Pipe Flow Examples	8.4-8.5
	26	Apr. 14	External Flow Characteristics, Lift and Drag Concepts	9.1
15	27	Apr. 19	Boundary Layer Characteristics	9.2
	28	Apr. 21	Friction and Pressure Drag, Drag Coefficients	9.3
16		Apr. 26	**Reading Day-No Class**	
	29	Apr. 28	**Final Exam (12:30-3:30)**	